

Program-Level Assessment: Annual Report

Program: Civil Engineering	Department: Department of Civil, Computer and Electrical Engineering
Degree or Certificate Level: Bachelor of Science	College/School: School of Science and Engineering
Date (Month/Year): March/2024	Primary Assessment Contact: Dr. Jalil Kianfar, PE
In what year was the data upon which this report is based collected? 2020/2021, 2021/2022, 2022/2023	
In what year was the program's assessment plan most recently reviewed/updated? 2022/2023	

1. Student Learning Outcomes

Which of the program's student learning outcomes were assessed in this annual assessment cycle?

- 3) An ability to communicate effectively with a range of audiences.

- 6) An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

- 9) An ability to explain basic concepts in management, business, public policy, and leadership.

2. Assessment Methods: Artifacts of Student Learning

Which artifacts of student learning were used to determine if students achieved the outcome(s)? Please identify the course(s) in which these artifacts were collected. Clarify if any such courses were offered a) online, b) at the Madrid campus, or c) at any other off-campus location.

- 3) An ability to communicate effectively with a range of audiences.**
- | | |
|-----------|--|
| CVNG 3020 | Final Project Oral Presentation and Report |
| CVNG 3140 | Water Resources and Entrepreneurship Presentation |
| CVNG 4500 | Capstone Preliminary Design Alternatives Project Presentation and Report |
| CVNG 4510 | Capstone Final Design Project Presentation and Report |
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- 6) An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgement to draw conclusions.**
- | | |
|-----------|--|
| CVNG 3030 | Fiber-reinforced Concrete Bowling Ball Project |
| CVNG 3041 | Total carbonate and non-carbonate hardness of tap water laboratory |
| CVNG 3100 | Hydraulic conductivity of soils laboratory |
| CVNG 3140 | Pump characteristics curves laboratory |
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- 9) An ability to explain basic concepts in management, business, public policy, and leadership.**
- | | |
|-----------|---|
| CVNG 3040 | Homework assignment on climate change |
| CVNG 3070 | Graded assignment on project management |
| CVNG 3070 | Exam question on project management |
| CVNG 3100 | Consolidation lab with project management focus |

3. Assessment Methods: Evaluation Process

What process was used to evaluate the artifacts of student learning, and by whom? Please identify the tools(s) (e.g., a rubric) used in the process and include them in/with this report.

The Faculty Review process includes a self-assessment at the course level followed by an independent review of specific outcomes by two faculty members who did not contribute to that respective outcome. Each independent reviewer was asked to answer the following questions:

- 1) What are the critical program strengths identified in this outcome?
- 2) What are the critical program weaknesses identified in this outcome?
- 3) Are there suggested plans of action to improve the results of this outcome? If so, are they adequate?
- 4) To what extent is the outcome met by the assessment measures on a scale of 1-5?
(1 = Not at all, 2 = Slightly, 3 = Moderately, 4 = Mostly, 5 = Completely)

Following the independent review of the outcomes, the faculty meet for an assessment retreat as a group to develop a collective plan of action to address any weaknesses.

Note: All rubrics are included at the end of this report.

3) An ability to communicate effectively with a range of audiences.

Outcome 3 was assessed using four different assignments/projects in four different courses. Two courses covered specific sub-disciplines, while the third and fourth are the culminating capstone experience. Those four courses are CVNG 3020- Project Management, CVNG 3140- Hydraulic Engineering Lab, CVNG 4500-Capstone Design I, and CVNG 4510- Capstone Design II. It should be noted that the CVNG 3020 - Project Management course was modified to CVNG 2070 - Construction & Project Management as part of the continuous improvements in the civil engineering program and to better align the civil engineering curriculum with the University Core requirements. This change went into effect for the class of 2026, and the modified course was first offered in the Fall 2023 semester. However, in the current assessment cycle the assessment tools related to this outcome are the same in both courses.

6) An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

Outcome 6 was assessed using four different assignments in four different courses. Three of the courses were laboratory courses related to different sub-disciplines, and the fourth course was a lecture class with a laboratory component. Those four courses are CVNG 3030- Civil Engineering Materials, CVNG 3041- Sustainability and Environmental Engineering Lab, CVNG 3100- Geotechnical Engineering Lab, and CVNG 3140- Hydraulic Engineering Lab. It should be noted that the CVNG 3030 - Civil Engineering Materials course was expanded to include CVNG 3030 Civil Engineering Materials and CVNG 3031 Civil Engineering Materials Laboratory courses as part of the continuous improvements in the civil engineering program, effective for the class of 2026. However, the assessment tools related to this outcome are the same for both courses in the current assessment cycle. The CVNG 3031 Civil Engineering Materials Laboratory course was first offered in the Fall 2022 semester.

9) An ability to explain basic concepts in management, business, public policy, and leadership.

Outcome 9 was assessed using four different methods—assignments, exams, and lab reports—across three distinct courses covering three sub-disciplines within civil engineering. These courses, which encompass topics related to management, business, public policy, and leadership, are CVNG 3040—Sustainability and Environmental Engineering, CVNG 3070—Project Management, and CVNG 3100—Geotechnical Engineering Lab.

4. Data/Results

What were the results of the assessment of the learning outcome(s)? Please be specific. Does achievement differ by teaching modality (e.g., online vs. face-to-face) or on-ground location (e.g., STL campus, Madrid campus, other off-campus site)?

3) An ability to communicate effectively with a range of audiences.

Three of the assessment measures—CVNG 3012, CVNG 4500, and CVNG 4510—consistently met the benchmark of 80% for the rubric score during the three-year assessment period. The CVNG 4510 assessment measure did not meet the benchmark of 80% for the rubric score during the 2020-2021 academic year but met the benchmark in the subsequent two years. The CVNG 3020 assessment measure met the benchmark of 80% for the rubric score in 2020-2021 and 2021-2022, but not during the 2022-2023 academic year. It is worth mentioning that the assessment measure for 2022-2023 was 76.92%, falling 3.08% short of the 80% benchmark.

One of the assessment measures – CVNG 4500 – consistently met the benchmark of 80% for the raw score during the three-year assessment period. Another assessment measure – CVNG 4510 - did not meet the benchmark of 80% for the rubric score during the 2020-2021 academic year but met the benchmark in the subsequent two years. The CVNG 3020 assessment measure met the benchmark of 80% for the raw score in 2020-2021 and 2022-2023 but did not meet the benchmark in 2021-2022. Raw scores are not reported for the CVNG 3012 assessment measure because this assignment is not used in calculating course grades and is only used for assessing Outcome 3.

Overall, this outcome was met. Seven out of nine (78%) of the assessment measures met 80% for the raw score, and 11 out of 12 (92%) of the assessment measures met 80% for the rubric score. These results are consistent with the previous assessment cycle (2019-2020), in which 75% of the assessment measures met 80% for the raw score, and 100% of the assessment measures met 80% for the rubric score.

Outcome 3 Assessment Results Summary for 2020-2021, 2021-2022, 2022-2023 (Current)

Year	Course	CVNG 3020		CVNG 3012		CVNG 4500		CVNG 4510	
	Assess. Measure	Final Project		Water Res. & Entrepreneurship		Prelim. Design Alt. Project		Final Design Project	
	Scoring	Raw Score	Rubric Score	Raw Score	Rubric Score	Raw Score	Rubric Score	Raw Score	Rubric Score
2020 - 2021	Average	2.18	1.88	---	2.64	2.45	2.25	2.25	2.5
	SD	0.73	0.33	---	0.5	0.51	0.38	0.47	0.51
	High	3	2	---	3	3	3	2.8	3
	Median	2	2	---	3	2	2	2.2	2.5
	Low	1	1	---	2	2	2	1.8	2
	Total Pts	0		---		2		2	
	≥ 70%	14		---		20		10	
	< 70%	3		---		0		10	
	% ≥ 70%	82.36		---		100		50	
	Target		2		0		2		2
≥ 2		15		11		20		20	
< 2		2		1		0		0	
% ≥ 2		88.24		91.67		100		100	
Status		Met	Met	---	Met	Met	Met	Not Met	Met
2021 - 2022	Average	1.58	2.21	---	2.5	2.38	2.18	2.35	2.5
	SD	0.51	0.42	---	0.51	0.22	0.25	0.22	0
	High	2	3	---	3	2.75	2.5	2.67	2.5
	Median	2	2	---	2.5	2.25	2	2.17	2.5
	Low	1	2	---	2	2.2	2	2.17	2.5
	Total Pts	2		---		2		2	
	≥ 70%	11		---		14		14	
	< 70%	8		---		0		0	
	% ≥ 70%	57.89		---		100		100	

	Target	2	0	2	2				
	≥ 2	19	20	14	14				
	< 2	0	0	0	0				
	% ≥ 2	100	100	100	100				
	Status	Not Met	Met	---	Met	Met	Met		
	Average	2.46	2	---	2.46	2.31	2.22	2.07	2
	SD	0.52	0.71	---	0.52	0.24	0.43	0.14	0
	High	3	3	---	3	2.67	3	2.33	2
	Median	2	2	---	2	2.33	2	2	2
	Low	2	1	---	2	2	2	2	2
	Total Pts	2	---	2	2			2	
	≥ 70%	13	---	18	18			18	
	< 70%	0	---	0	0			0	
	% ≥ 70%	100	---	100	100			100	
	Target	2	0	2	2			2	
	≥ 2	10	13	18	18			18	
	< 2	3	0	0	0			0	
	% ≥ 2	76.92	100	100	100			100	
	Status	Met	Not Met	---	Met	Met	Met	Met	Met

Outcome 3 Assessment Results Summary for 2019-2020 (Previous)

Year	Course	CVNG 3020		CVNG 3012		CVNG 4510		CVNG 4510	
		Assess. Measure		Water Res. & Entrepreneurship		Prelim. Design Alt. Project		Final Design Project	
	Scoring	Raw Score	Rubric Score	Raw Score	Rubric Score	Raw Score	Rubric Score	Raw Score	Rubric Score
2019 - 2020	Average	2	2	---	---	2.07	2.29	2.27	2.36
	SD	0.65	0.65	---	---	0.21	0.46	0.29	0.42
	High	3	3	---	---	2.25	3	2.75	3
	Median	2	2	---	---	2.25	2	2.125	2
	Low	1	1	---	---	1.75	2	2	2
	Total Pts	2	---	2	2			2	
	≥ 70%	12	---	16	21			21	
	< 70%	3	---	5	0			0	
	% ≥ 70%	80	---	76.19	100			100	
	Target	2	---	2	2			2	
≥ 2	12	---	21	21			21		
< 2	3	---	0	0			0		
% ≥ 2	80	---	100	100			100		
Status	Met	Met	Not	Collected	Not Met	Met	Met	Met	

6) An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgement to draw conclusions.

During the three-year assessment period, all four assessment measures successfully met the raw score benchmark of 80%. It should be noted that in the 2020-2021 academic year, the CVNG 3041 and CVNG 3140 assessments were not implemented in their respective courses due to challenges related to the COVID-19 pandemic. Additionally, data for the CVNG 3041 assessment measure was not collected and reported in 2021-2022 due to other factors. Three of the assessment measures met the rubric score benchmark of 80% during the assessment period; however, the CVNG 3030 assessment measure did not meet the benchmark. The assessment results are consistent with those of the previous assessment period (2019-2020 academic year), where only one course did not meet the rubric score benchmark.

Outcome 6 Assessment Results Summary for 2020-2021, 2021-2022, 2022-2023 (Current)

Year	Course	CVNG 3030		CVNG 3041		CVNG 3100		CVNG 3140	
	Assess. Measure	Fiber-reinforced Concrete Bowling Ball Project		Total Carbonate and Non-carbonate Hardness of Tap Water Laboratory		Compaction Laboratory		Pump Characteristics Curve Laboratory	
	Scoring	Raw Score	Rubric Score	Raw Score	Rubric Score	Raw Score	Rubric Score	Raw Score	Rubric Score
2020 - 2021	Average	86.36	1.5	---	----	92.93	2.71	---	----
	SD	1.28	0.52	---	----	5.57	0.47	---	----
	High	87	2	---	----	98	3	---	----
	Median	87	1.5	---	----	94	3	---	----
	Low	84	1	---	----	85	2	---	----
	Total Pts	100		----		100		----	
	≥ 70%	14		----		14		----	
	< 70%	0.00		----		0.00		----	
	% ≥ 70%	100		----		100		----	
	Target		2		----		2		----
≥ 2		7		----		14		----	
< 2		7		----		0		----	
% ≥ 2		50		----		100		----	
Status		Met	Not Met	Not	Collected	Met	Met	Not	Collected
2021 - 2022	Average	91.5	1.75	---	----	88.71	2.76	91.35	2.55
	SD	3.39	0.45	---	----	5.05	0.44	9.21	0.83
	High	94	2	---	----	92	3	99	3
	Median	93	2	---	----	92	3	96.5	3
	Low	86	1	---	----	80	2	75	1
	Total Pts	100		----		100		100	
	≥ 70%	16		----		17		20	
	< 70%	0.00		----		0.00		0.00	
	% ≥ 70%	100		----		100		100	
	Target		2		----		2		2
≥ 2		12		----		17		16	
< 2		4		----		0		4	
% ≥ 2		75		----		100		80	
Status		Met	Not Met	Not	Collected	Met	Met	Met	Met
2022-2023 (Current)	Average	93.25	1.5	18.38	2.38	33.5	2	89.42	2.62
	SD	7.71	0.52	0.88	0.5	0.89	0	4.89	0.51
	High	100	2	20	3	35	2	98	3
	Median	95.5	1.5	18	2	33	2	88	3
	Low	82	1	17.6	2	33	2	83.5	2
	Total Pts	100		20		35		100	
	≥ 70%	16		16		16		13	
	< 70%	0.00		0.00		0.00		0.00	
	% ≥ 70%	100		100		100		100	
	Target		2		2		2		2
≥ 2		8		16		16		13	
< 2		8		0		0		0	
% ≥ 2		50		100		100		100	
Status		Met	Not Met	Met	Met	Met	Met	Met	Met

Outcome 6 Assessment Results Summary for 2019-2020 (Previous)

	Course	CVNG 3030		CVNG 3041		CVNG 3100		CVNG 3140	
Year	Assess. Measure	Fiber-reinforced Concrete Bowling Ball Project		Total Carbonate and Non-carbonate Hardness of Tap Water Laboratory		Compaction Laboratory		Pump Characteristics Curve Laboratory	
	Scoring	Raw Score	Rubric Score	Raw Score	Rubric Score	Raw Score	Rubric Score	Raw Score	Rubric Score
2019 - 2020	Average	98.55	1.17	9.65	2.68	85.88	2	93	2.33
	SD	1.18	0.38	0.32	0.48	4.41	0	4.05	0.78
	High	100	2	10	3	90	2	99	3
	Median	99	1	9.5	3	85	2	92.5	2.5
	Low	97	1	9.3	2	80	2	87	1
	Total Pts	100		10		100		100	
	≥ 70%	18		19		17		12	
	< 70%	0.00		0.00		0.00		0.00	
	% ≥ 70%	100		100		100		100	
	Target		2		2		2		2
≥ 2		3		19		17		10	
< 2		15		0		0		2	
% ≥ 2		16.67		100		100		83.33	
Status		Met	Not Met	Met	Met	Met	Met	Met	Met

9) An ability to explain basic concepts in management, business, public policy, and leadership.

In the three-year assessment period, the raw score and rubric score measures successfully met the 80% benchmark in three courses with the exception of raw score benchmark for CVNG 3040 and CVNG 3100 rubric score benchmark in 2022-2023 academic year. It is worth mentioning that the assessment measure rubric score for CVNG 3100 in 2022-2023 academic year was 75% which is only 5% short of the 80% benchmark. It should be noted that CVNG 3040 assessment data were not collected in 2020-2021 academic year due to COVID-19 pandemic and were not collected in 2021-2022 due to other factors. In the previous assessment period (2019-2020 academic year) all the assessment measures met the 80% benchmark for raw score and rubric score. However, in the current assessment period 90% of the assessment measures met the benchmark.

Outcome 9 Assessment Results Summary for 2020-2021, 2021-2022, 2022-2023 (Current)

	Course	CVNG 3040		CVNG 3070		CVNG 3070		CVNG 3100	
Year	Assess. Measure	HW assignment on climate change and sequestration		Graded Assignment on Project Management		Exam Question on Project Management		Consolidation Lab with Project Management Focus	
	Scoring	Raw Score	Rubric Score	Raw Score	Rubric Score	Raw Score	Rubric Score	Raw Score	Rubric Score
2020 - 2021	Average	---	---	5	2.79	5	2.79	175.71	2.29
	SD	---	---	0	0.43	0	0.43	19.7	0.47
	High	---	---	5	3	5	3	190	3
	Median	---	---	5	3	5	3	185	2
	Low	---	---	5	2	5	2	140	2
	Total Pts	---		5		5		200	
	≥ 70%	---		14		14		14	
	< 70%	---		0		0		0	
	% ≥ 70%	---		100		100		100	
	Target		---		2		2		2
≥ 2		---		14		14		14	
< 2		---		0		0		0	
% ≥ 2		---		100		100		100	
Status		Not	Collected	Met	Met	Met	Met	Met	Met

2021 - 2022	Average	---	---	4.97	2.44	5	2.5	174.41	2.24
	SD	---	---	0.12	0.62	0	0.62	7.48	0.44
	High	---	---	5	3	5	3	185	3
	Median	---	---	5	2.5	5	3	175	2
	Low	---	---	4.5	1	5	1	165	2
	Total Pts	---	---	5	---	5	---	200	---
	≥ 70%	---	---	18	---	18	---	17	---
< 70%	---	---	0	---	0	---	0	---	
% ≥ 70%	---	---	100	---	100	---	100	---	
Target	---	---	---	2	---	2	---	2	
≥ 2	---	---	---	17	---	17	---	17	
< 2	---	---	---	1	---	1	---	0	
% ≥ 2	---	---	---	94.44	---	94.44	---	100	
Status	Not	Collected	Met	Met	Met	Met	Met	Met	Met
2022 - 2023	Average	7.08	2.42	4.88	2.15	5	2.69	29	2
	SD	1.24	0.51	0.3	0.69	0	0.48	2.83	0.73
	High	9	3	5	3	5	3	32	3
	Median	6.5	2	5	2	5	3	29.5	2
	Low	6	2	4	1	5	2	25	1
	Total Pts	10	---	5	---	5	---	35	---
	≥ 70%	5	---	13	---	13	---	16	---
< 70%	7	---	0	---	0	---	0	---	
% ≥ 70%	41.67	---	100	---	100	---	100	---	
Target	---	2	---	2	---	2	---	2	
≥ 2	---	12	---	11	---	13	---	12	
< 2	---	0	---	2	---	0	---	4	
% ≥ 2	---	100	---	84.62	---	100	---	75	
Status	Not Met	Met	Met	Met	Met	Met	Met	Met	Not Met

Outcome 9 Assessment Results Summary for 2019-2020 (Previous)

Year	Course	CVNG 3040		CVNG 3070		CVNG 3070		CVNG 3100	
	Assess. Measure	HW assignment on climate change and sequestration		Graded Assignment on Project Management		Exam Question on Project Management		Consolidation Lab with Project Management Focus	
	Scoring	Raw Score	Rubric Score	Raw Score	Rubric Score	Raw Score	Rubric Score	Raw Score	Rubric Score
2019 - 2020	Average	9.67	2.67	46.44	2	87.33	2.5	187.35	2.47
	SD	0.52	0.52	3.13	0	8.6	0.62	2.57	0.51
	High	10	3	50	2	96	3	190	3
	Median	10	3	46	2	90.5	3	185	2
	Low	9	2	40	2	62	1	185	2
	Total Pts	10	---	50	---	100	---	200	---
	≥ 70%	6	---	18	---	17	---	17	---
< 70%	0	---	0	---	1	---	0	---	
% ≥ 70%	100	---	100	---	94.44	---	100	---	
Target	---	2	---	2	---	2	---	2	
≥ 2	---	6	---	18	---	17	---	17	
< 2	---	0	---	0	---	1	---	0	
% ≥ 2	---	100	---	100	---	94.44	---	100	
Status	Met	Met	Met	Met	Met	Met	Met	Met	Met

5. Findings: Interpretations & Conclusions

What have you learned from these results? What does the data tell you?

3) An ability to communicate effectively with a range of audiences.

Independent Faculty Review

1. The program develops students' communication skills throughout their four-year civil engineering program, with assessments conducted during their junior and senior years. These assessments encompass both written and oral communication.
2. There are no significant issues with this outcome. Even in cases where the benchmark was not met, the grades were very close to the benchmark threshold. It should be noted that, given the small class sizes at SLU, one or two students underperforming could lead to an outcome not being met.
3. No improvement plan is necessary for this outcome. One suggestion is to provide opportunities for students to present their work to industry professionals.
4. The average rating for this outcome was a 4.0. The outcome was **mostly** met and has room for improvement.

6) An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgement to draw conclusions.

Independent Faculty Review

1. The program provides hands-on learning experiences across various courses, enabling students to conduct civil engineering-related experiments in multiple laboratory courses. Different types of experiments from four different labs are used to assess this outcome.
2. There are no significant weaknesses associated with this outcome. However, materials and/or data were not collected, presented, and discussed for a few courses. Assessments for two of the four courses did not provide enough details on how to improve and make changes.
3. While this outcome is generally met, there is an opportunity to provide more details about the suggested improvement plans by faculty.
4. The average rating for this outcome was a 3.0. The outcome was **moderately** met and has some room for improvement.

9) An ability to explain basic concepts in management, business, public policy, and leadership.

Independent Faculty Review

1. This outcome is assessed in three different courses and has been met in 12 out of 13 instances.
2. The next step is to revisit this outcome's "instruments/measures" to reaffirm that the assessment is directly related to the outcome. However, the current objectives are mostly being met, but there is room for improvement: Data collection for the environmental course needs to be consistent. No data were collected for this course in a two-year period. It is also noted that all the instruments are used in the junior year. However, there are limited senior-year courses in which all seniors enroll, which creates a challenge for assessing this outcome in the senior year.
3. There are no significant shortcomings that require academic intervention. However, if in the next review of outcome instruments/rubrics the faculty determine that the instruments are not directly related to the outcome, a new set of instruments/measure should be developed.
4. The average rating for this outcome was a 3.0. The outcome was **moderately** met and has some room for improvement.

6. Closing the Loop: Dissemination and Use of Current Assessment Findings

- A. When and how did your program faculty share and discuss these results and findings from this cycle of assessment?

Civil Engineering Program Meeting—ABET/HLC

Meeting Minutes

Tuesday, September 19, 2023, 10:00 am - 12:00 pm, MDD 1058

Attendance:

Present: Anesh Borthakur, Chris Carroll, Amanda Cox, Riyadh Hindi, Jalil Kianfar, and Ronaldo Luna

Absent: None

Visitors: None

- 1. Meeting topic:** The topic of this meeting was focused on the Assessment Retreat portion of the Annual ABET/HLC Student Outcomes Assessment Process. The specific purpose was to evaluate the Faculty Review of Outcomes 3 and 6, and Develop a Plan of Action that addresses any weaknesses that were identified during the assessment and review processes for this cycle.
- 2. Review of Student Outcomes and Rubrics:** The Faculty Review process includes a self-assessment at the course level followed by an independent review of specific outcomes by a faculty member who did not contribute to that respective outcome. For the 2023 review, Drs. Kianfar and Borthakur were the independent reviewers for Outcome 3 and Drs. Hindi and Kianfar were the independent reviewers for Outcome 6. Each independent reviewer was asked to answer the following questions:
 - 5) What are the critical program strengths identified in this outcome?
 - 6) What are the critical program weaknesses identified in this outcome?
 - 7) Are there suggested plans of action to improve the results of this outcome? If so, are they adequate?
 - 8) To what extent is the outcome met by the assessment measures on a scale of 1-5?
(1 = Not at all, 2 = Slightly, 3 = Moderately, 4 = Mostly, 5 = Completely)

The following sections summarize brief discussions and activities related to Outcome 3 during the meeting.

Dr. Kianfar discussed the various courses used for collecting data for outcome 3. Dr. Kianfar, having reviewed this outcome, noted the program's strength in consistently working to improve students' communication skills over their four-year study period at SLU. He observed no significant issues or weaknesses in this outcome, even in instances where the benchmark was marginally missed.

Dr. Borthakur, agreed with Dr. Kianfar assessment. However, he raised a concern regarding the impact of small class sizes on the outcome assessment, suggesting the involvement of industry partners in student presentations. Dr. Carroll shared his perspective on the structural analysis course, acknowledging that the presentations initially lacked quality but have improved over the years, especially with the cohort that received presentation skills training in their freshman year. He suggested data collection from CVNG 1000 introduction to civil engineering courses as a new assessment measure for this outcome. Dr. Hindi raised a concern about the excessive data collection from capstone classes, suggesting a reduction in assessment measures. Dr. Luna agreed on the importance of assessing seniors but proposed the removal of one junior class assessment measure, specifically from the hydraulic engineering lab, due to overlapping activities and insufficient data collection. Dr. Cox mentioned the impact of the pandemic on lab activities but concurred that the reliance on a single lab for multiple outcomes seemed excessive, signaling a need for reassessment of the evaluation methods.

Dr. Kianfar provided a comprehensive overview of Outcome 6, emphasizing its focus on developing appropriate experimentation, analyzing and interpreting data, and using engineering judgment to draw conclusions. He noted the outcome is evaluated based on student work in four civil engineering courses: the civil engineering materials class, environmental engineering lab, geotechnical engineering lab, and hydraulic engineering lab. He pointed out

that while the Geotech and Hydraulic engineering labs consistently met the raw score and rubric score benchmarks, the environmental engineering lab only did well when data were appropriately collected. However, he expressed concern that the civil engineering materials class was not meeting the rubric benchmark, despite the instructor's observations of improving report quality and student experiments.

Dr. Hindi raised concern about the data from the environmental engineering lab not being collected over two years and suggested that since the geotechnical and hydraulic engineering lab assessment measure have consistently met the benchmark, it is time to choose new activities from these labs to evaluate this student outcome.

Dr. Carroll agreed that since some of the assessment measures have been consistently met, it is time to replace these assessment measures with other activities. He noted that the compaction laboratory from Geotech lab and pump characteristic curve lab from hydraulic engineering lab could be replaced with other experiments from same courses or be substituted with experiments from entirely different labs.

Dr. Carroll expanded on the details of the materials lab term project. He explained that, although the lab is taught by an adjunct instructor, he is responsible for the assessment of the materials course. In this project, students are required to experiment with different concrete mix designs. They must then decide which mix to use for their final project based on their trial mixes, a process that relies on engineering judgment. Dr. Carroll expressed concerns regarding the students' approach to these trials. He noted that many students seem to rely more on trial and error rather than a scientific process, and do not consider factors such as compressive strength, the impact of using lightweight materials, and workability in their experiment. This observation led him to rate many of the projects as 'one'. He emphasized that the project's intention is for students to conduct several trial mixes, analyze the results, and then make an informed decision based on their findings. Considering that a new instructor will soon take over the course, he plans to share this feedback and past issues with the incoming instructor to ensure these concerns are addressed in future teachings.

Dr. Cox contributed to the discussion with her thoughts on improving the hydraulic engineering assessment measure for Outcome 6. She expressed her appreciation for the idea of selecting a more challenging lab to focus on, aligning with the concept of continuous improvement. Agreeing with the feedback received, Dr. Cox suggested replacing the pump characteristic curve lab with the hydraulic jump lab. She explained that the hydraulic jump lab is significantly more challenging than the pump curves, suggesting this change as a means to elevate the learning experience and challenge for the students.

There was discussion among faculty regarding use of both students raw grades and rubric grades for assessing the outcome. While the final decision was not made, the census seemed to be using rubric scores as the only metric for assessing the outcomes.

The meeting also featured a discussion among Drs. Hindi, Luna, Cox, and Carroll on the topic of using group work versus individual work in the assessment process. Drs. Luna and Carroll shared their approach of utilizing CATME for assessing group work, highlighting its effectiveness in removing self-evaluation bias. Dr. Cox added to the conversation by mentioning her practice of asking students to identify their specific contributions to each lab and lab report. This approach aims to ensure clarity and fairness in the assessment of both individual and collaborative efforts in their coursework.

End of Meeting Minutes

Civil Engineering Program Meeting—ABET/HLC

Meeting Minutes

Thursday, September 21, 2023, 11:00 am - 12:00 pm, MDD 1058

Attendance:

Present: Anesh Borthakur, Chris Carroll, Amanda Cox, Riyadh Hindi, Jalil Kianfar, and Ronaldo Luna

Absent: None

Visitors: None

3. **Meeting topic:** The topic of this meeting was focused on the Assessment Retreat portion of the Annual ABET/HLC Student Outcomes Assessment Process. The specific purpose was to evaluate the Faculty Review of Outcome 9 and Develop a Plan of Action that addresses any weaknesses that were identified during the assessment and review processes for this cycle.
4. **Review of Student Outcomes and Rubrics:** The Faculty Review process includes a self-assessment at the course level followed by an independent review of specific outcomes by a faculty member who did not contribute to that respective outcome. For the 2023 review, Drs. Hindi and Kianfar were the independent reviewers for Outcome 9.
 - 9) What are the critical program strengths identified in this outcome?
 - 10) What are the critical program weaknesses identified in this outcome?
 - 11) Are there suggested plans of action to improve the results of this outcome? If so, are they adequate?
 - 12) To what extent is the outcome met by the assessment measures on a scale of 1-5?
(1 = Not at all, 2 = Slightly, 3 = Moderately, 4 = Mostly, 5 = Completely)

Discussions related to outcome 9:

Dr. Kianfar presented an overview of the assessment process. Initially, independent reviewers reported on their assessment of ABET Outcome 9. Subsequently, instructors shared their suggested improvements for the courses, where applicable, which were followed by a discussion among the entire civil engineering faculty. Finally, the faculty collectively approved the action plan for addressing Outcome 9.

Dr. Hindi expressed concern about the relevance of these courses and the assessment measures to this outcome, especially in the areas of business and leadership. Although management and public policy are included, it appears these topics are not covered extensively. Additionally, the data for two years of environmental engineering is missing. There is a need to make sure the data are collected consistently. A future plan is needed to select more relevant components and courses for better assessment and to improve the documentation process. There are some courses in which the outcome is being consistently met. The faculty also need to reevaluate these assessment methods to ensure they are challenging and effective.

Dr. Kianfar expressed concerns similar to Dr. Hindi and raised the question of if the current assessment measures are effectively covering the key areas of management, business, public policy, and leadership. Kianfar emphasized the importance of using appropriate tools for assessment, stating that if the right instruments are used, the assessment process would be satisfactory. However, his primary worry centers on the actual scope of assessment in addressing these crucial areas. Dr. Luna mentioned that the project management course is about business too. Dr. Hindi mentioned that the assessment measures do not have a strong focus on business aspects.

Dr. Carroll noted that the project management course is in a transition phase, with juniors still taking the course as a two-credit-hour class and sophomores as a three-credit-hour class. Dr. Carroll suggested that it might be beneficial for the group to review the course content to ensure it aligns with their objectives, especially since the course has been renamed to "Construction and Project Management." He proposed integrating more aspects of

construction engineering into the curriculum.

Dr. Carroll highlighted the bridge-construction project, originally developed by West Point. This project encompasses various aspects of project management, including estimations and a bid process. He believed that this project could serve as a better assessment tool for evaluating students' project management skills, as it covers a broad range of relevant topics.

Addressing a concern previously raised by Dr. Hindi about students scoring nearly 100%, which could be due to the lack of challenging content, Dr. Carroll suggested that the bridge project could provide a more effective way to evaluate students. He proposed that in the coming months, the group should review and revise the course content, and identify additional assessment measures.

Moving on to the topic of leadership, Carroll shared his approach with freshmen students in the "CVNG 1000 Intro to Civil Engineering" using the Lego Serious Play methodology. This exercise involves students creating their ideal teammate, which invariably highlights leadership qualities. He offered to develop an assessment measure regarding leadership for this outcome and evaluate this outcome in the CVNG 1000 course. Dr. Luna inquired about incorporating leadership into group projects. Carroll explained that leadership is an integral part of the group projects. He described his method of having students identify their ideal team member during team formation. This process is recorded and saved in their group's Google Drive folder. If conflicts arise within the team, Carroll directs them to revisit their video to remind them of their initial commitments and expectations regarding leadership and teamwork. He shared that this approach had been effective in resolving conflicts in a group the previous year.

Dr. Luna contributed to the meeting by addressing the topic of the Geotech lab. He acknowledged the group's consensus that the lab was not effectively aligned with the desired outcomes. Presenting two options, Dr. Luna suggested either removing the lab from the curriculum or revising the lab's assessment measures and rubrics to make them more comprehensible and relevant. He emphasized that the lab requires leadership skills for successful completion over time. Dr. Luna proposed to provide a more detailed elaboration on the assessment measures to better highlight and explain the leadership and management aspects integral to the Geotech lab.

Dr. Cox highlighted an important distinction regarding Outcome 9. She pointed out that the focus was not demonstrating project management or leadership skills, but on the ability to explain concepts related to leadership and project management. She emphasized the need to pay attention to the learning objective of the outcome. Dr. Carroll added to the discussion by reminding everyone that incorporating these additional outcomes was a suggestion from ASCE. He noted that this outcome was in addition to the seven outcomes recruited by ABET. Dr. Hindi stated that once an outcome is chosen, it must be assessed.

With regards to leadership aspect of this outcome, Dr. Carroll proposed a method to integrate leadership assessment into the freshman class. He suggested developing an open-ended question regarding leadership along with a rubric to assesses students response to this outcome. Dr. Luna agreed with Carroll's suggestion and added that leadership could also be incorporated into the senior design course. Riyadh Hindi chimed in, indicating that this was in line with his own recommendation.

In terms of the environmental engineering measure about carbon sequestration, Dr. Hindi suggested that the assessment measure be redeveloped given that a new full time faculty member will be teaching this course moving forward.

End of meeting minutes

B. How specifically have you decided to use these findings to improve teaching and learning in your program? For example, perhaps you've initiated one or more of the following:

Changes to the Curriculum or Pedagogies

- Course content
- Teaching techniques
- Improvements in technology
- Prerequisites

- Course sequence
- New courses
- Deletion of courses
- Changes in frequency or scheduling of course offerings

Changes to the Assessment Plan

- Student learning outcomes
- Artifacts of student learning
- Evaluation process

- Evaluation tools (e.g., rubrics)
- Data collection methods
- Frequency of data collection

Please describe the actions you are taking as a result of these findings.

3) An ability to communicate effectively with a range of audiences.

Listed below are the detailed plans of action associated with each course for continuous improvement related to Outcome 3.

CVNG 1000 Intro to Civil Engineering: An assessment measure will be developed in the spring 2024 semester to assess this outcome in the Introduction to Civil Engineering course and evaluate first-year students' ability to communicate with a range of audiences. This assessment measure will substitute the CVNG 3140 Water Resources and Entrepreneurship presentation.

CVNG 3030/3031: A new instructor will be teaching this course in Fall 2023. Project reports from previous offerings of the course will be provided to the instructor to highlight past issues and aid in developing activities to enhance student learning and outcomes.

CVNG 3140: The faculty has decided to replace the CVNG 3140 Water Resources and Entrepreneurship presentation with a presentation from the "CVNG 1000 Intro to Civil Engineering" course, which is taught in the freshman year. The rubric for the CVNG 1000 activity will be developed in Spring 2024.

CVNG 4500 Prelim. Design Alt. Project: No issues are related to student learning; however, there have occasionally been issues with limited faculty participation as independent reviewers for presentations due to sabbaticals and retirements. While 2022-2023 was an anomaly, presentations could be recorded in the future, allowing faculty to review them at a later time if they are unable to attend the presentations.

CVNG 4510 Final Design Project: A similar plan of action is in place as with CVNG 4500. The only issue is related to limited participation by faculty as independent reviewers. This issue is not expected to recur as 2022-2023 was an anomaly, but presentations could be recorded to be evaluated by faculty at a later time in case similar issues arise again.

6) An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

Listed below are the detailed plans of action associated with each course for continuous improvement related to Outcome 6.

CVNG 3030 Civil Engineering Materials Lab: The faculty have identified the issue related to the Fiber-reinforced Concrete Bowling Ball Project as it appears students are following a trial and error approach in their concrete mix design rather than a scientific experiment approach. A new instructor will be teaching this course moving forward, and this issue, along with other items identified by the faculty, will be communicated to the instructor.

CVNG 3041 Sustainability and environmental engineering lab: No improvement plan was developed for Total carbonate and non-carbonate hardness of tap water laboratory as data for this lab was not collected in the first two

years of the review cycle. If this lab consistently meets the thresholds in the next review cycle, it will be phased out from the assessment of outcome 6 and will be replaced with a new assessment measure from this lab. It should be noted that a new full-time faculty will be teaching this course in Fall 2024 and future semesters.

CVNG 3100 Geotechnical Engineering Lab: Considering that the Compaction laboratory has consistently met both raw score and rubric score thresholds, it will be phased out from being used to assess Outcome 6. A new assessment measure, most likely the grain size distribution lab, will be used to assess this outcome in future semesters. The assessment measure and its rubric will be developed and approved by the faculty in the spring 2024 semester.

CVNG 3140 Hydraulic Engineering Lab: Both the raw score and rubric score thresholds for the Pump characteristics curves laboratory have been consistently met in the previous assessment cycles. Consequently, this assessment measure will no longer be used for assessing outcome 6 and will be replaced with a new assessment measure related to the Hydraulic jump lab. The rubric for the Hydraulic jump lab will be developed in the spring 2024 semester.

9) c

Listed below are the detailed plans of action associated with each course for continuous improvement related to Outcome 9.

CVNG 1000 Intro to Civil Engineering: A new assessment measure will be developed to assess first-year students enrolled in this course to explain leadership skills. This assessment measure will most likely be developed based the Lego Serious Play activity, or will relate to an open-ended question about leadership.

CVNG 3040 Sustainability and Environmental Engineering: A new full-time faculty member will assume teaching this course moving forward, and the Homework assignment on climate change will be modified as part of the faculty efforts to re-develop the course.

CVNG 2070 Construction and Project Management: The Graded assignment on project management has been used to assess this learning outcome in the previous assessment cycles. While the benchmark threshold for this assessment measure has been consistently met; the faculty have decided to substitute this assessment measure with a new assessment measure. As part of the civil engineering continuous improvement process, the number of credit hours for this course increased from two to three credit hours. A new syllabus for this course will be developed in spring and summer 2024 along with the new assessment measure. The new measure will consider management and business concepts, and most likely will relate to West Point bridge construction project.

CVNG 3100 Geotechnical Engineering Lab: The Consolidation lab with project management focus rubric will be modified to better clarify the connection between the project management aspects of this lab and the consolidation experiment.

CVNG 4510 Capstone Desing II: A new assessment measure will be developed in spring 2024 to assess student ability to define leadership concepts.

If no changes are being made, please explain why.

7. Closing the Loop: Review of Previous Assessment Findings and Changes

A. What is at least one change your program has implemented in recent years as a result of assessment data?

One particular change made during the fall 2020 semester with regard to CVNG 3030 for Outcome 6:

"Based on the final reports, it appears that the majority of groups misunderstood what they needed to evaluate during the preliminary mix design phase of the project. Most of the groups simply compared the unit weights of the mixes to ensure they were underweight on the project and gave no consideration to compressive strength. Given that compressive strength is a critical property of concrete mix design, it is important that students understand the importance of related comparisons when designing and selecting a mix. The reports also indicated that students may not understand how to theoretically adjust concrete mix proportions beyond the example given in class. The adjunct instructor will be encouraged to convey the expected deliverables of the project to ensure the students are evaluating various parameters properly and to spend more time on mix design and how to manipulate those mixes to obtain the desired results."

B. How has this change/have these changes been assessed?

The changes were assessed in the 2020-2021 academic year through normal assessment activities.

C. What were the findings of the assessment?

In the 2019-2020 academic year, 100% of students scored at least a 70% on the design problem (satisfactory) and 16% scored at least a 2 (unsatisfactory) on the corresponding rubric.

In the 2020-2021 academic year, 100% of students scored at least a 70% on the design problem (satisfactory) and 50% scored at least a 2 (unsatisfactory) on the corresponding rubric. In the 2021-2022 academic year, 100% of students scored at least a 70% on the design problem (satisfactory) and 75% scored at least a 2 (unsatisfactory) on the corresponding rubric. In the 2022-2023 academic year, 100% of students scored at least a 70% on the design problem (satisfactory) and 50% scored at least a 2 (unsatisfactory) on the corresponding rubric.

Even though the student score on the rubric has significantly improved in comparison to the 2019-2020 academic year, the benchmark score of at least 70% on the rubric has not been met yet.

D. How do you plan to (continue to) use this information moving forward?

The faculty have identified the additional factors that contribute to this outcome not being met, and have shared the suggestions with the course instructor. The program will continue to collect data for this activity and will re-evaluate in the next assessment cycle.

IMPORTANT: Please submit any assessment tools and/or revised/updated assessment plans along with this report.

3) An ability to communicate effectively with a range of audiences.

Course: CVNG 1000 – Introduction to Civil Engineering

New Outcome: 3—An ability to communicate effectively with a range of audiences.

Assessment measure currently being developed.

Course: CVNG 3020 – Structural Analysis Lab

New Outcome: 3—An ability to communicate effectively with a range of audiences.

Old Outcome: g—An ability to communicate effectively.

Performance Measure: Final Project Oral Presentation (Oral Communication)

1 – Does not meet expectations	2 – Meets expectations	3 – Exceeds expectations
<p>The presentation is not well organized (e.g. material out of order) and the supporting materials insufficiently supports the topic.</p> <p>OR</p> <p>The language choices are unclear and minimally support the topic. The delivery technique detracts from the understandability of the presentation and the speaker(s) appears uncomfortable.</p>	<p>The presentation is organized and the supporting materials make appropriate reference to information that supports the topic. The language is appropriate for the audience and supports the topic. The delivery techniques make the presentation interesting and the speaker(s) appears comfortable.</p>	<p>The presentation is very well organized and the supporting materials make reference to information that significantly supports the topic.</p> <p>AND</p> <p>The language is compelling and enhances the effectiveness of the presentation. The delivery techniques make the presentation interesting and the speaker(s) appears polished and confident.</p>

Course: CVNG 3020 – Structural Analysis Lab

New Outcome: 3—An ability to communicate effectively with a range of audiences.

Old Outcome: g—An ability to communicate effectively.

Performance Measure: Final Project Report (Written Communication)

1 – Does not meet expectations	2 – Meets expectations	3 – Exceeds expectations
<p>The report is not well organized (e.g. sections out of order) and the necessary detail to describe the work completed is lacking.</p> <p>OR</p> <p>The authors demonstrate minimal attention to context and purpose. The language sometimes impedes the meaning because of errors in usage.</p>	<p>The report is organized and mostly includes the necessary detail to describe the work completed. The background theory is adequate, but relevant source information may be lacking. The authors demonstrate awareness of context and purpose. The language is clear and the writing contains few grammatical errors.</p>	<p>The report is very well organized and includes the necessary detail to describe the work completed. The background theory is adequate, complete with relevant source information.</p> <p>AND</p> <p>The authors demonstrate a thorough understanding of context and purpose. The language is clear and the writing is virtually error-free.</p>

Course: CVNG 3140 – Hydraulic Engineering Lab

New Outcome: 3—An ability to communicate effectively with a range of audiences.

Old Outcome: g— An ability to communicate effectively.

Performance Measure: Water Resources and Entrepreneurship Presentation (Oral Communication)

1 – Does not meet expectations	2 – Meets expectations	3 – Exceeds expectations
<p>The presentation is not well organized (e.g. material out of order) and the supporting materials insufficiently supports the topic.</p> <p>OR</p> <p>The language choices are unclear and minimally support the topic. The delivery technique detracts from the understandability of the presentation and the speaker(s) appears uncomfortable.</p>	<p>The presentation is organized and the supporting materials make appropriate reference to information that supports the topic. The language is appropriate for the audience and supports the topic. The delivery techniques make the presentation interesting and the speaker(s) appears comfortable.</p>	<p>The presentation is very well organized and the supporting materials make reference to information that significantly supports the topic.</p> <p>AND</p> <p>The language is compelling and enhances the effectiveness of the presentation. The delivery techniques make the presentation interesting and the speaker(s) appears polished and confident.</p>

Course: CVNG 4500 – Capstone Design I

New Outcome: 3—An ability to communicate effectively with a range of audiences.

Old Outcome: g—An ability to communicate effectively.

Performance Measure: Capstone Final Design Alternatives Project Presentation (Oral Communication)

1 – Does not meet expectations	2 – Meets expectations	3 – Exceeds expectations
<p>The presentation is not well organized (e.g. material out of order) and the supporting materials insufficiently supports the topic.</p> <p>OR</p> <p>The language choices are unclear and minimally support the topic. The delivery technique detracts from the understandability of the presentation and the speaker(s) appears uncomfortable.</p>	<p>The presentation is organized and the supporting materials make appropriate reference to information that supports the topic. The language is appropriate for the audience and supports the topic. The delivery techniques make the presentation interesting and the speaker(s) appears comfortable.</p>	<p>The presentation is very well organized and the supporting materials make reference to information that significantly supports the topic.</p> <p>AND</p> <p>The language is compelling and enhances the effectiveness of the presentation. The delivery techniques make the presentation interesting and the speaker(s) appears polished and confident.</p>

Course: CVNG 4500 – Capstone Design I

New Outcome: 3—An ability to communicate effectively with a range of audiences.

Old Outcome: g—An ability to communicate effectively.

Performance Measure: Capstone Preliminary Design Alternatives Project Report (Written Communication)

1 – Does not meet expectations	2 – Meets expectations	3 – Exceeds expectations
<p>The report is not well organized (e.g. sections out of order) and the necessary detail to describe the work completed is lacking.</p> <p>OR</p> <p>The authors demonstrate minimal attention to context and purpose. The language sometimes impedes the meaning because of errors in usage.</p>	<p>The report is organized and mostly includes the necessary detail to describe the work completed. The background theory is adequate, but relevant source information may be lacking. The authors demonstrate awareness of context and purpose. The language is clear and the writing contains few grammatical errors.</p>	<p>The report is very well organized and includes the necessary detail to describe the work completed. The background theory is adequate, complete with relevant source information.</p> <p>AND</p> <p>The authors demonstrate a thorough understanding of context and purpose. The language is clear and the writing is virtually error-free.</p>

Course: CVNG 4510 – Capstone Design II

New Outcome: 3—An ability to communicate effectively with a range of audiences.

Old Outcome: g—An ability to communicate effectively.

Performance Measure: Capstone Final Design Project Presentation (Oral Communication)

1 – Does not meet expectations	2 – Meets expectations	3 – Exceeds expectations
<p>The presentation is not well organized (e.g. material out of order) and the supporting materials insufficiently supports the topic.</p> <p>OR</p> <p>The language choices are unclear and minimally support the topic. The delivery technique detracts from the understandability of the presentation and the speaker(s) appears uncomfortable.</p>	<p>The presentation is organized and the supporting materials make appropriate reference to information that supports the topic. The language is appropriate for the audience and supports the topic. The delivery techniques make the presentation interesting and the speaker(s) appears comfortable.</p>	<p>The presentation is very well organized and the supporting materials make reference to information that significantly supports the topic.</p> <p>AND</p> <p>The language is compelling and enhances the effectiveness of the presentation. The delivery techniques make the presentation interesting and the speaker(s) appears polished and confident.</p>

Course: CVNG 4510 – Capstone Design II

New Outcome: 3—An ability to communicate effectively with a range of audiences.

Old Outcome: g—An ability to communicate effectively.

Performance Measure: Capstone Final Design Project Report (Written Communication)

1 – Does not meet expectations	2 – Meets expectations	3 – Exceeds expectations
<p>The report is not well organized (e.g. sections out of order) and the necessary detail to describe the work completed is lacking.</p> <p>OR</p> <p>The authors demonstrate minimal attention to context and purpose. The language sometimes impedes the meaning because of errors in usage.</p>	<p>The report is organized and mostly includes the necessary detail to describe the work completed. The background theory is adequate, but relevant source information may be lacking. The authors demonstrate awareness of context and purpose. The language is clear and the writing contains few grammatical errors.</p>	<p>The report is very well organized and includes the necessary detail to describe the work completed. The background theory is adequate, complete with relevant source information.</p> <p>AND</p> <p>The authors demonstrate a thorough understanding of context and purpose. The language is clear and the writing is virtually error-free.</p>

6) An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgement to draw conclusions.

Course: CVNG 3030 – Civil Engineering Materials

New Outcome: 6—An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgement to draw conclusions.

Old Outcome: b—An ability to design and conduct experiments, as well as to analyze and interpret data.

Performance Measure: Fiber-reinforced Concrete Project

1 – Does not meet expectations	2 – Meets expectations	3 – Exceeds expectations
<p>The report lacks the minimum number of concrete mixtures needed for a comparison or only provides the results of the initial trial mixtures without discussion of concrete compressive strength and unit weight limitations.</p> <p>OR</p> <p>Fails to discuss the performance of the selected mix design with regard to durability and toughness.</p>	<p>The report illustrates an attempt to evaluate at least two different concrete mixtures to satisfy the needs of the fiber-reinforced concrete project. The report includes the comparison and discussion of concrete compressive strength and unit weight differences at a minimum.</p> <p>AND</p> <p>The report also discusses the performance of the selected mixture design with regard to durability and toughness.</p>	<p>The report includes a thorough evaluation of more than two concrete mixtures to satisfy the needs of the Fiber-reinforced concrete project. The results include a comparison of concrete compressive strengths and weight differences along with discussion of workability observations during trials.</p> <p>AND</p> <p>The report includes a thorough discussion of the performance of the selected mix design with regard to durability and toughness, including the calculation of toughness.</p>

Course: CVNG 3041 – Sustainability and Environmental Engineering

New Outcome: 6—An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgement to draw conclusions.

Old Outcome: b— An ability to design and conduct experiments, as well as to analyze and interpret data.

Performance Measure: Total Carbonate and Non-carbonate Hardness of Tap Water Laboratory

1 – Does not meet expectations	2 – Meets expectations	3 – Exceeds expectations
<p>Hardness fractions were not measured mostly properly using two techniques, OR Method was not properly delineated. OR Report was not well written.</p>	<p>Hardness fractions were measured mostly properly using two techniques. Method was mostly properly delineated. Report had appropriate formatting, was reasonably well written and concise, and conclusions were well thought out.</p>	<p>Hardness fractions were measured properly using two techniques. Method was properly delineated. Report had proper formatting, was well written and concise, and conclusions were accurate.</p>

Course: CVNG 3100 – Geotechnical Engineering Lab

New Outcome: 6—An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgement to draw conclusions.

A new assessment measure is currently being developed.

Course: CVNG 3140 – Hydraulic Engineering Lab

New Outcome: 6—An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgement to draw conclusions.

A new assessment measure is currently being developed.

9) An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgement to draw conclusions.

Course: CVNG 1000 – Introduction to Civil Engineering

New Outcome: 9— An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgement to draw conclusions.

A new assessment measure currently being developed.

Course: CVNG 3040 – Sustainability and Environmental Engineering

Outcome: 9 / m—An ability to explain basic concepts in management, business, public policy, and leadership.

Performance Measure: Homework Problem on Climate Change

1 – Does not meet expectations	2 – Meets expectations	3 – Exceeds expectations
<p>Did not sufficiently list or describe three means that society may use to sequestration carbon dioxide to inhibit climate change.</p> <p>AND</p> <p>Did not sufficiently describe the major negative impact or impacts for each carbon sequestration method.</p>	<p>Listed and somewhat described three means that society may use to sequestration carbon dioxide to inhibit climate change. Properly described the major negative impact or impacts for each carbon sequestration method.</p>	<p>Properly described three means that society may use to sequestration carbon dioxide to inhibit climate change. Properly described the major negative impact or impacts for each carbon sequestration method.</p>

Course: CVNG 3070 – Engineering Project Management

Outcome: 9 / m—An ability to explain basic concepts in management, business, public policy, and leadership.

Performance Measure: Graded assignment on project management (scope and resources)

1 – Does not meet expectations	2 – Meets expectations	3 – Exceeds expectations
<p>The assignment on scope of work and resources focused on management of a project. A basic understanding of the reading was not apparent by the answers to the questions presented. Few of them were not framed correctly and were confusing.</p> <p>OR</p> <p>The interpretation of the essay reading was incorrect, and several statements were incoherent.</p>	<p>The assignment on scope of work and resources focused on management of a project. An understanding of the reading was apparent by the answers to the questions presented. Most of them were correct within a coherent framework.</p> <p>OR</p> <p>The interpretation of the essay reading was correct, and several statements were coherent.</p>	<p>The assignment on scope of work and resources focused on management of a project. An understanding of the reading was apparent by the answers to the questions presented. All of them were correct within a comprehensive and coherent answers. In some cases it exceeded the requirements of the assignment.</p> <p>OR</p> <p>The interpretation of the essay reading was correct, and all the statements were coherent.</p>

Course: CVNG 3070 – Engineering Project Management

Outcome: 9 / m—An ability to explain basic concepts in management, business, public policy, and leadership.

A new assessment measure currently being developed.

Course: CVNG 4510 – Capstone Design II

Outcome: 9 / m—An ability to explain basic concepts in management, business, public policy, and leadership.

A new assessment measure currently being developed.